

**HYBRID MOLECULAR MEMORY DEVICES AND
METHODS OF USE THEREOF**

5 **Abstract**

The present invention provides hybrid microelectronic memory device, comprising: (a) a substrate having a surface, a first region of first work function adjacent the surface, and a second region of second work function adjacent the surface and adjacent the first region; (b) a film comprising redox-active molecules on the first and
10 second regions; and (c) an electrode connected to the film. The present invention further provides a hybrid microelectronic memory device, comprising: (a) a substrate having surface and a structure or region such as a diode for increasing the retention time of the device formed adjacent the surface; (b) a film comprising redox-active molecules on or associated with the region or structure; and (c) an electrode
15 connected to the redox active molecules opposite the substrate surface. Methods of using such devices are also described.

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